(P41) Cytotoxicity of mycotoxins after gamma irradiation

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Due to the high toxicity of mycotoxins, many methods have been used to reduce or eliminate them from food and feed. Gamma radiation is one technique that has been investigated with some promising results in the degradation of mycotoxins from food commodities. The aims of this study were (i) to clarify the effect of gamma irradiation on aflatoxin B1 (AFB1), aflatoxin B2, aflatoxin G1, aflatoxin G2 and ochratoxin A (OTA); (ii) to evaluate the effect of the presence of water during irradiation; and (iii) to evaluate the cytotoxicity of degradation products resulting from irradiation.

Solutions with the same initial mycotoxin concentration were submitted to gamma radiation doses ranging from 1 to 10.0kGy, at distinct moisture levels (dehydrated, in water and in methanol:water solution). After irradiation, mycotoxins levels were determined by HPLC with fluorescence detection and photochemical post-column derivatization (for aflatoxins). Mycotoxins cytotoxicity was assessed in Hep G2 cells using a battery of assays covering different modes of action including alterations of metabolic activity, plasma membrane integrity and lysosomal function.

Degradation of mycotoxins was observed at radiation doses above 3.0kGy, but only when irradiated in an aqueous environment. In dehydrated samples, no significant reduction of mycotoxins concentration and toxicity was observed comparing with controls. The production of hydroxyl radicals in presence of water could explain this difference. Cytotoxicity assays showed, for some mycotoxins (AFB1, OTA and mix of aflatoxins) a significant reduction of cytotoxicity with increasing radiation doses. For aflatoxins, a 2kGy dose was sufficient to eliminate almost all toxicity. For

OTA, a toxicity reduction of approx. 10% was only achieved. No increase of cytotoxicity was observed for any of the mycotoxins after irradiation. These results point out that irradiation may contribute for the reduction of some mycotoxins on food commodities.

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